UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/647,544	10/26/2000	Evy Lundgren-Akerlund	003300-685	8350

21839 7590 09/10/2002

BURNS DOANE SWECKER & MATHIS L L P
POST OFFICE BOX 1404
ALEXANDRIA, VA 22313-1404

EXAMINER
HADDAD, MAHER M

ART UNIT	PAPER NUMBER
1644	12

DATE MAILED: 09/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/647,544	Applicant(s) LUNDGREN-AKERLUND, EVY	
	Examiner Maher M. Haddad	Art Unit 1644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *24 June 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-137* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-137* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. It is noted that SEQ ID NO: 2 and SEQ ID NO: 4 are referred to as amino acid sequences in claims 1 and 2. line 2, while the same sequences are referred to in claims 4, 6, 9, line 4, as nucleotide sequences. Correction is required.

2. Applicant's election of Group I, Claims 1-9, in Paper No. 11, filed 6/24/02, is acknowledged. Upon reconsideration, however, the previous restriction requirement is vacated. A new restriction follows. The Examiner apologizes for any inconvenience or delay.

3. Restriction is required under 35 U.S.C. 121 and 372.
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

4. In accordance with 37 CFR 1.499, applicant is required, in response to this action, to elect a single invention to which the claims must be restricted.

I. Claims 1, 22-25, 76 and 126, drawn to a recombinant or isolated collagen binding integrin subunit α10 comprising the amino acid of SEQ ID NO:2.

II. Claims 1, 22, 76 and 126, drawn to recombinant or isolated collagen binding integrin subunit α10 comprising the amino acid of SEQ ID NO:4.

III. Claims 2, 4-9, 27, 76, 132-133, 135, drawn to an isolated polynucleotide of SEQ ID NO: 1 encoding polypeptide of SEQ ID NO: 2 comprising a nucleotide coding for or hybridizes to a DNA or RNA coding for an integrin subunit α10, or for homologues or fragments thereof , vectors, host cells and a process of producing.

IV. Claims 2, 4-9, 27, 76, 132-133, 135, drawn to an isolated polynucleotide of SEQ ID NO: 3 encoding polypeptide of SEQ ID NO: 4 comprising a nucleotide coding for or hybridizes to DNA or RNA coding foran integrin subunit α10, or for homologues or fragments thereof , vectors, host cells, and a process of producing.

V. Claim 3, drawn to a process of providing an integrin subunit α10, or homologue, or fragments thereof, wherein said subunit is isolated from a cell.

VI. Claims 10, 12, 28, 30, 73-75 and 85, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are antibodies.

VII. Claims 10, 12, 28, 30, 73-75 and 85, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4 or to homologues or fragments thereof, wherein the binding entities are antibodies.

VIII. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are protein.

IX. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4, or to homologues or fragments thereof, wherein the binding entities are protein.

X. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are peptides.

XI. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4, or to homologues or fragments thereof, wherein the binding entities are peptides.

XII. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are carbohydrates.

XIII. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4, or to homologues or fragments thereof, wherein the binding entities are carbohydrates.

XIV. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are lipids.

XV. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4, or to homologues or fragments thereof, wherein the binding entities are lipids.

XVI. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:2, or to homologues or fragments thereof, wherein the binding entities are ligands.

XVII. Claims 10-11 and 28-29, drawn to binding entities having the capability of binding to an integrin subunit of α10 of SEQ ID NO:4, or to homologues or fragments thereof, wherein the binding entities are ligands.

XVIII. Claims 13-14 and 76, drawn to a recombinant or isolated integrin heterodimer comprising a subunit α10 of SEQ ID NO:2 and a β subunit.

XIX. Claim 15, drawn to a process of producing a recombinant integrin heterodimer comprising a subunit α10 of SEQ ID NO:2 and a β subunit.

XX. Claims 13-14 and 76, drawn to a recombinant or isolated integrin heterodimer comprising a subunit α10 of SEQ ID NO:4 and a β subunit.

XXI. Claim 15, drawn to a process of producing a recombinant integrin heterodimer comprising a subunit α10 of SEQ ID NO:4 and a β subunit.

XXII. Claim 16, drawn to a process of providing a integrin heterodimer comprising a subunit of α10 and α subunit β, wherein the integrin heterodimer is isolated from a cell.

XXIII. Claim 17, drawn to a cell containing a first vector, said first vector comprising a polynucleotide or oligonucleotide coding for a subunit α10 of SEQ ID NO:2 and a second vector, wherein the second vector comprising a polynucleotide coding for a subunit β of an integrin heterodimer.

XXIV. Claim 17, drawn to a cell containing a first vector, said first vector comprising a polynucleotide or oligonucleotide coding for a subunit α10 of SEQ ID NO:4 and a second vector, wherein the second vector comprising a polynucleotide coding for a subunit β of an integrin heterodimer.

XXV. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is proteins.

XXVI. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is peptides.

XXVII. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is carbohydrates.

XXVIII. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is lipids.

XXIX. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is natural integrin binding ligands.

XXX. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is proteins.

XXXI. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is peptides.

XXXII. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is carbohydrates.

XXXIII. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is lipids.

XXXIV. Claim 18-20, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is natural integrin binding ligands.

XXXV. Claim 18-19 and 21, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 2 and a β subunit wherein the binding entity is antibodies.

XXXVI. Claim 18-19 and 21, drawn to binding entities having the capacity to bind specifically to isolated heterodimer comprising an integrin subunit a10 of SEQ ID NO: 4 and a β subunit wherein the binding entity is antibodies.

XXXVII. Claim 26, drawn to a method of producing a fragment of the integrin subunit α10 encoding SEQ ID NO: 7.

XXXVIII. Claim 26, drawn to a method of producing a fragment of the integrin subunit α10 encoding amino acid No. 952-986 of SEQ ID NO: 2.

XXXIX. Claim 26, drawn to a method of producing a fragment of the integrin subunit α10 encoding amino acid No. 140-337 of SEQ ID NO: 2.

XL. Claims 31 and 37-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLI. Claims 31 and 37-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence of SEQ ID NO:4 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLII. Claims 31 and 36-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:2 and a subunit β1 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLIII. Claims 31 and 36-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:4 and a subunit β1 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLIV. Claims 31-33, 37-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence of SEQ ID NO:7 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLV. Claims 31-32, 34 and 37-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence No. 952-986 of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLVI. Claims 31-32, 35 and 37-45, drawn to a method of using an integrin subunit α10 *in vitro* comprising using the amino acid sequence No. 140-337 of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

XLVII. Claims 46 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence of SEQ ID NO:2 as a markers or target molecules of cell or tissues expressing said integrin subunit α10.

XLVIII. Claims 46 and52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence of SEQ ID NO:4 as a markers or target molecules of cell or tissues expressing said integrin subunit α10.

XLIX. Claims 46, 51 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence of an integrin heterodimer comprising SEQ ID NO:2 and

subunit β1 as a markers or target molecules of cell or tissues expressing said integrin subunit α10.

L. Claims 46, 51 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence of an integrin heterodimer comprising SEQ ID NO:4 and subunit β1 as a markers or target molecules of cell or tissues expressing said integrin subunit α10.

LI. Claims 46-48 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence of SEQ ID NO:7 as a markers or target molecules of cell or tissures expressing said integrin subunit α10.

LII. Claims 46-47, 49 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence No. 952-986 of SEQ ID NO:2 as a markers or target molecules of cell or tissures expressing said integrin subunit α10.

LIII. Claims 46-47, 50 and 52-53, drawn to method of using binding entities having the capability of binding specifically to an integrin subunit α10 *in vitro* comprising using an amino acid sequence No. 140-337 of SEQ ID NO:2 as a markers or target molecules of cell or tissures expressing said integrin subunit α10.

LIV. Claims 54-63 and 107-116, drawn to a method for detecting the presence of an integrin subunit α10, using a polynucleotide or oligonucleotide encoding SEQ ID NO:2.

LV. Claims 64, 69-72, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding SEQ ID NO:2.

LVI. Claims 64-66 and 69-72, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding SEQ ID NO:7.

LVII. Claims 64-65, 67 and 69-72, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding amino acid No. 952-986 of SEQ ID NO:2.

LVIII. Claims 64-65, 68 and 69-72, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding amino acid No. 140-337 of SEQ ID NO:2.

LIX. Claim 77, drawn to a method of using the integrin subunit of a10 of SEQ ID NO: 2 as a marker or target in transplantation of cartilage or chondrocytes *in vitro*.

LX. Claim 77, drawn to a method of using the integrin subunit of a10 of SEQ ID NO: 4 as a marker or target in transplantation of cartilage or chondrocytes *in vitro*.

LXI. Claim 78, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 in vitro comprising binding the amino acid sequence of SEQ ID NO:2, for **promoting adhesion** of chondrocytes and/or osteobasts.

LXII. Claim 78, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 in vitro comprising binding the amino acid sequence of SEQ ID NO:4, for **promoting adhesion** of chondrocytes and/or osteobasts.

LXIII. Claim 78, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 in vitro comprising binding the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:2 and a subunit β, for **promoting adhesion** of chondrocytes and/or osteobasts.

LXIV. Claim 78, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 in vitro comprising binding the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:4 and a subunit β, for **promoting adhesion** of chondrocytes and/or osteobasts.

LXV. Claim 79, drawn to a method of detecting the presence of integrin binding entities *in vitro*, comprising interacting with an integrin heterodimer comprising a subunit α10 and a subunit β, thereby causing said integrin to modulate the binding to its natural ligand or other proteins.

LXVI. Claim 79, drawn to a method of detecting the presence of integrin binding entities *in vitro*, comprising interacting with a subunit α10 thereby causing said integrin to modulate the binding to its natural ligand or other proteins.

LXVII. Claims 80-81, drawn to a method of studying consequences of the interaction of a human heterodimer integrin *in vitro*, comprising interacting a subunit α10 and a subunit β with an integrin binding entity and thereby initiating a cellular reaction.

LXVIII. Claims 80-81, drawn to a method of studying consequences of the interaction of a human heterodimer integrin *in vitro*, comprising interacting a subunit α10 with an integrin binding entity and thereby initiating a cellular reaction.

LXIX. Claims 82-83, drawn to a method of using DNA or RNA *in vitro*, comprising encoding an integrin subunit α10 or homologues, fragments thereof as a target molecule.

LXX. Claim 84, drawn to a method of using a human heterodimer integrin in vitro, comprising using a subunit α10 and a subunit β, as a marker or target molecule during angiogenesis.

LXXI. Claim 84, drawn to a method of using a human heterodimer integrin in vitro, comprising using a subunit α10, as a marker or target molecule during angiogenesis.

LXXII. Claim 84, drawn to a method of using a human heterodimer integrin in vitro, comprising using DNA or RNA encoding a subunit α10 and a subunit β, as a marker or target molecule during angiogenesis.

LXXIII. Claim 84, drawn to a method of using a human heterodimer integrin in vitro, comprising using DNA or RNA encoding a subunit α10, as a marker or target molecule during angiogenesis.

LXXIV. Claims 86, 92-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXV. Claims 86, 92-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence of SEQ ID NO:4 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXVI. Claims 86, 91-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence of an integrin heterodimer comprising SEQ ID NO:2 and a subunit β as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXVII. Claims 86, 91-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence of an integrin heterodimer comprising SEQ ID NO:4 and a subunit β as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXVIII. Claims 86-88, 92-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence of SEQ ID NO:7 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXIX. Claims 86-87, 89, 92-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence No. 952-986 of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXX. Claims 86-87, 90, 92-98, drawn to a method of using a collagen binding integrin subunit α10 comprising using the amino acid sequence No. 140-337 of SEQ ID NO:2 as a marker or target molecule of cells or tissues expressing said integrin subunit α10.

LXXXI. Claims 99, 105-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid of SEQ ID NO:2 as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXII. Claims 99, 105-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid of SEQ ID NO:4 as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXIII. Claims 99, 104-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid of an integrin hetrodimer comprising SEQ ID NO:2 and a subunit β as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXIV. Claims 99, 104-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid of an integrin hetrodimer comprising SEQ ID NO:4 and a subunit β as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXV. Claims 99-101, 105-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid of SEQ ID NO:7 as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXVI. Claims 99-100, 102, 105-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid No. 952-986 of SEQ ID NO:2 as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXVII. Claims 99-100, 103, 105-106, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit α10 comprising using the amino acid No. 140-337 of SEQ ID NO:2 as markers or target molecules of cells or tissues expressing said integrin subunit α10.

LXXXVIII. Claims 117 and 122-125, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding SEQ ID NO:2.

LXXXIX. Claims, 117-119 and 122-125, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding SEQ ID NO:7.

XC. Claims 117-118, 120 and 122-125, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding amino acid No. 952-986 of SEQ ID NO:2.

XCI. Claims 117-118, 121 and 122-125, drawn to a method of determining the differentiation-state of cells during development in vitro, in pathological conditions, in tissue regeneration and in therapeutic and physiological reparation of cartilage using a polynucleotide or oligonucleotide encoding amino acid No. 140-337 of SEQ ID NO:2.

XCII. Claim 127, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 comprising binding the amino acid sequence of SEQ ID NO:2, for **promoting adhesion** of chondrocytes and/or osteobasts.

XCIII. Claim 127, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 comprising binding the amino acid sequence of SEQ ID NO:4, for **promoting adhesion** of chondrocytes and/or osteobasts.

XCIV. Claim 127, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 comprising binding the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:2 and a subunit β, for **promoting adhesion** of chondrocytes and/or osteobasts.

XCV. Claim 127, drawn to a method of using binding entities having the capability of binding specifically to an integrin subunit of α10 comprising binding the amino acid sequence of an integrin hetrodimer comprising SEQ ID NO:4 and a subunit β, for **promoting adhesion** of chondrocytes and/or osteobasts.

XCVI. Claim 128, drawn to a method of using an integrin heterodimer as a target for anti-adhesive drugs, comprising using an integrin subunit α10 and a subunit β as a target for anti-adhesive drugs.

XCVII. Claim 128, drawn to a method of using an integrin heterodimer as a target for molecule in tendon, comprising using an integrin subunit α10 and a subunit β as a target for molecule in tendon.

XCVIII. Claim 128, drawn to a method of using an integrin heterodimer as a target for ligament, comprising using an integrin subunit α10 and a subunit β as a target for ligament.

XCIX. Claim 128, drawn to a method of using an integrin heterodimer as a target for skeletal muscle, comprising using an integrin subunit α10 and a subunit β as a target for skeletal muscle.

C. Claim 128, drawn to a method of using an integrin heterodimer as a target for anti-adhesive drugs, comprising using an integrin subunit α10 as a target for anti-adhesive drugs.

CI. Claim 128, drawn to a method of using an integrin heterodimer as a target for molecule in tendon, comprising using an integrin subunit α10 as a target for molecule in tendon.

CII. Claim 128, drawn to a method of using an integrin heterodimer as a target for ligament, comprising using an integrin subunit α10 as a target for ligament.

CIII. Claim 128, drawn to a method of using an integrin heterodimer as a target for skeletal muscle, comprising using an integrin subunit α10 as a target for skeletal muscle.

CIV. Claim 129, drawn to a method of stimulating the formation of cartilage or bone, comprising administering to a subject a suitable amount a pharmaceutical agent.

CV. Claim 129, drawn to a method of stimulating the formation of cartilage or bone, comprising administering to a subject a suitable amount an antibody.

CVI. Claim 129, drawn to a method of inhibiting or blocking the formation of cartilage or bone, comprising administering to a subject a suitable amount a pharmaceutical agent.

CVII. Claim 129, drawn to a method of inhibiting or blocking the formation of cartilage or bone, comprising administering to a subject a suitable amount an antibody.

CVIII. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after infection, comprising administering to a subject a pharmaceutical agent.

CIX. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after inflammation, comprising administering to a subject a pharmaceutical agent.

CX. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after surgical intervention, comprising administering to a subject a pharmaceutical agent.

CXI. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after infection, comprising administering to a subject a antibody.

CXII. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after inflammation, comprising administering to a subject an antibody.

CXIII. Claim 130, drawn to a method of preventing adhesion between tendon/ligaments and the surrounding tissue after surgical intervention, comprising administering to a subject an antibody.

CXIV. Claim 131, drawn to a method of stimulating extracellular matrix synthesis and repair by activation of an integrin heterodimer comprising using a subunit α10 and a subunit β.

CXV. Claim 131, drawn to a method of stimulating extracellular matrix synthesis and repair by activation of an integrin heterodimer comprising using a subunit α10.

CXVI. Claim 131, drawn to a method of stimulating extracellular matrix synthesis and repair by blockage of an integrin heterodimer comprising using a subunit α10 and a subunit β.

CXVII. Claim 131, drawn to a method of stimulating extracellular matrix synthesis and repair by blockage of an integrin heterodimer comprising using a subunit α10.

CXVIII. Claim 134, drawn to a method of using a human heterodimer integrin, comprising using a subunit α10 and a subunit β, as a marker or target molecule during angiogenesis.

CXIX. Claim 134, drawn to a method of using a human heterodimer integrin, comprising using a subunit α10, as a marker or target molecule during angiogenesis.

CXX. Claim 134, drawn to a method of using a human heterodimer integrin, comprising using DNA or RNA encoding a subunit α10 and a subunit β, as a marker or target molecule during angiogenesis.

CXXI. Claim 134, drawn to a method of using a human heterodimer integrin, comprising using DNA or RNA encoding a subunit α10, as a marker or target molecule during angiogenesis.

CXXII. Claim 136, drawn to a method of using DNA or RNA encoding an integrin subunit α10 or homolues, or fragments thereof as target molecules comprising assaying for the presence of the α10 DNA or RNA in the cells.

CXXIII. Claim 137, drawn to a method of using an integrin subunit α10 as a marker or target comprising assaying for the presence of subunit α10 in the cells.

5. The inventions listed as Groups I-CXXIII do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The invention of Group III was found to have no special technical feature that defined the contribution over the prior art of Hillier *et al* (GenBank Accession No. N72734, 1996) (see entire document and the sequence alignment in particular).

Hillier et al teach a 447 nucleotide fragment of claimed SEQ ID NO:1 at positions (NA 3025-3295), a pT7T3D vector and a DH10B host cell.

Since Applicant's inventions do not contribute a special technical feature when viewed over the prior art they do not have a single general inventive concept and so lack unity of invention.

6. Irrespective of whichever group applicant may elect, applicant is further required under 35 US 121 (1) to elect a single disclosed species to which claims would be restricted if no generic claim is finally held to be allowable and (2) to list all claims readable thereon including those subsequently added.

A. If Group I is elected, applicant is required to elect a recombinant or isolated collagen binding integrin subunit α10, wherein the fragment such as in claims 23-25. These peptide fragments are distinct because their structures and modes of action are different.

B. If Group II is elected, applicant is required to elect a recombinant or isolated collagen binding integrin subunit α10, wherein the fragment is peptides of (a) the cytoplasmic

domain, (b) the I-domain or (c) the spliced domain. These peptide fragments are distinct because their structures and modes of action are different.

C. If Group III or IV is elected, applicant is required to elect an isolated polynucleotide, wherein the polynucleotide or oligonucleotide coding for a specific fragment such as a fragment in claims 22-25. These fragments are distinct because their structures and modes of action are different.

D. If anyone of Groups VI-XVII is elected, applicant is required to elect binding entities having the capability of binding specifically to a fragment such as in claims 22-25. These peptide fragments are distinct because their structures and modes of action are different.

E. If anyone of Groups XL-XLVI, LIV, LV-LVIII and LXXXVIII-XCI is elected, applicant is required to elect a method of using an integrin subunit $\alpha 10$ in vitro, a method for detecting the presence of an integrin subunit $\alpha 10$ or a method for determining the differentiation state of cells during development in pathological conditions, whereby the cells (such as a) chondroctes, b) smooth muscle, c) endothelial cells, d) osteoblasts or e) fibroblasts). These cells are distinct because each cell type represents patentably distinct subject matter.

F. If anyone of Groups LV-LVIII is elected, applicant is required to elect a method for determining the differentiation state of cells during development in pathological conditions, wherein the pathological condition is (a) rheumatoid arthritis, b) osteoarthrosis, c) cancer). These species are distinct because the pathological conditions differ in etiologies and therapeutic endpoints; thus each condition represents patentably distinct subject matter.

Applicant is required under 35 U.S.C. § 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claim 36 is generic.

7. Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maher Haddad whose telephone number is (703) 306-3472. The examiner

can normally be reached Monday through Friday from 8:00 AM to 4:30 PM. A message may be left on the examiner's voice mail service. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan can be reached on (703) 308-3973. Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center 1600 receptionist whose telephone number is (703) 308-0196.

Papers related to this application may be submitted to Technology Center 1600 by facsimile transmission. Papers should be faxed to Technology Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CM1 Fax Center telephone number is (703) 305-3014.

Maher Haddad, Ph.D.
Patent Examiner
Technology Center 1600
September 9, 2002

CHRISTINA CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600